

hereby submit this proposed amendments of specification and claims, for the Examiner's review and approval.

In the Specification:

1. Please disregard the amendments of drawings previously made in the January 10, 2002 and the October 11, 2001 Responses, and add new Figures 9-11 to the instant specification.

- HP 7/17/02
2. On page ⁶~~7~~, please replace the paragraph beginning at line ¹²~~4~~, with the following paragraph:

41 Fig. 1 is a schematic representation of one embodiment of the present invention, in the absence of hydrogen gas.

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3. On page ⁷~~8~~, please add the following new paragraphs after ^{line 9}~~the first paragraph~~:

Fig. 9 is a schematic representation of a third embodiment of the present invention, in the absence of hydrogen gas.

Fig. 10 is a schematic representation of the third embodiment of the present invention, in the presence of hydrogen gas.

Fig. 11 is a schematic representation of a fourth embodiment of the present invention, in the absence of hydrogen gas.

- HP 7/17/02
4. On page ¹⁸~~21~~, please replace the paragraph beginning on line ²³~~2~~, with the following paragraph:

43 Referring to Fig. 1, light bulb 10 comprising incandescent filament 16 has deposited thereon a rare earth metal thin film layer 12, preferably comprising a trivalent rare earth metal, such as yttrium, that is reversibly reactive with hydrogen to form both metal dihydride and metal trihydride reaction products. Over the rare earth metal thin film layer 12 is deposited a protective layer 14, comprising a suitable material, such as for example Pd, Pt, Ir, Ag, Au, Ni, Co, or alloys thereof, and most preferably comprising palladium. In the absence of hydrogen in the ambient environment to which the bulb is exposed, the rare earth metal thin film 12 is in a metallic,

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 optically reflective dihydride state. Light from filament 16 is attenuated by the dihydride state of rare earth metal thin film layer 12 and thus only a portion of it reaches photo-detector 18.

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 5. On page ¹⁹22, please replace the paragraph beginning on line ²⁴4, with the following paragraph:

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 In Figure 1, filament 16 of coated light bulb 10 is additionally a heat source, elevating the temperature of rare earth thin film 12. The transition of rare earth thin film 12 from reflective dihydride to transparent trihydride state and back, in response to the absence or presence, respectively, of hydrogen occurs much more rapidly at elevated temperatures. This reduces both the response time of the detector in the presence of hydrogen and its recovery to the opaque "null state" in the absence of hydrogen.

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 6. On page ²²28, please add the following paragraphs before the paragraph beginning at line ²⁶16.

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 Figures 9 and 10 depict another embodiment of the present invention, wherein the light source and the thermal energy source are separate elements. Figure 9 shows a hydrogen gas detector 30 in the absence of hydrogen, which comprises a light source 32, a thermal energy source 34 that is separate from the light source 32, an optical filter 36, and a light detector 38, and Figure 10 shows such hydrogen gas detector 30 in the presence of hydrogen. The optical filter 36 is placed in proximity to the light source 32, so that the optical filter 36 is illuminated with light from the light source 32. Additionally, the optical filter 36 is operatively coupled to the thermal energy source 34, so that the optical filter 36 is heated by the thermal energy source 34 to an elevated temperature, at which the hydrogen gas sensor 30 responds to the presence of hydrogen and recovers in the absence of hydrogen much more rapidly. The light source 32 can be any light-generating device, such as incandescent bulbs, light emitting diodes, fluorescence lamps, electroluminescent lamps, optical lasers, and optical waveguides illuminated by any such light-generating element. The thermal energy source 34 can be any heat-generating element that is separated from the light source, such as resistive wires, exothermic chemical reactions, ultrasonic radiation, acoustic radiation, microwave radiation, and laser radiation. The optical filter 36 may comprise a rare earth metal thin film that is overlaid by a protective layer 37, which may in turn comprise a hydrogen-permeable material, ^{that is doped with a dopant} such as Mg, Ca, Al, Ir, Ni, or Co, or a metal selected from the group consisting of palladium, platinum, and iridium. The spatial arrangement of the light source 32, the thermal energy source 34, and the optical filter 36 is only exemplary in Figures 9 and 10, and shall not be construed to limit the broad scope of the present invention.